

THE BOSTON SUNDAY GLOBE • FEBRUARY 4, 1996

Spill scientists mixing oil and water

By Peter J. Howe
GLOBE STAFF

DUXBURY — Not far from this town's famous beach, there's a place where people are eagerly conspiring to create oil spills — strictly in the spirit of environmentalism.

Inside a 1,000-gallon wave tank, a sort of jumbo Jacuzzi, researchers with Battelle Marine Science are creating and analyzing controlled mini-disasters in weather conditions that mimic everything from Norway in January to Venezuela in June.

One of only three such tanks in the world, the 9-month-old Battelle facility is

1,000-gallon tank used for cleanups

helping oil spill specialists fill in the blanks in their understanding of how petroleum products behave in a range of weather and sea conditions, and how those conditions affect cleanup strategies.

The facility also serves as a badly needed testing ground for new chemicals designed to break up spills.

Over the long run, lessons learned in the \$750,000 laboratory could help oil companies and government agencies funding the research to do a better job the next

time they face a supertanker disaster like the 1989 Exxon Valdez wreck off Alaska or the 1979 Argo Merchant spill off Cape Cod.

"Learning how to better predict oil behavior is really the name of the game" in improving petroleum spill cleanups, said Allen D. Uhler, a senior Battelle researcher who helped advise US officials during last month's comparatively minor Rhode Island heating oil spill. "It's all about your windows of opportunity and when they

close."

Knowing how to clean up a spill is tricky. During the first hours after a petroleum spill in the ocean, it is rapidly transformed through evaporation and wave-driven emulsification, the process by which oil mixed with water becomes a yogurt-like mess.

Depending on weather and ocean temperature, a chemical treatment that might work 12 hours after one spill might be useless, or even harmful, 12 hours after another.

The work at Battelle, which has run
SPILLS, Page 28



Researchers Stanley Ostazeski and Allen D. Uhler pose next to the Battelle Marine Science oil spill tank.

GLOBE STAFF PHOTO / TOM LANDERS

Spill researchers mixing oil and water

■ SPILLS

Continued from Page 29

four big experiments involving different petroleum products since it began operating the tank last April, is helping flesh out scientific understanding of which responses will work or fail at various times after different products spill.

The Battelle lab was initially launched under a contract with the Marine Spill Response Corp., a nationwide cleanup business financed by the major oil companies that was formed under congressional prodding following the Alaska disaster.

Related to that effort, the National Oceanic and Atmospheric Administration maintains a computer program called ADIOS - complete with a sombrero logo - that predicts how everything from Abu Dhabi to Zaire crude, and scores of refined products like soupy bunker fuel and jet gasoline, will change in the ocean under different conditions.

The ADIOS system, which cleanup crews consulted in the Rhode Island spill, allows users to punch in petroleum type, ocean temperature, wind speed and several other factors.

They get back graphs that indicate, for example, how many hours it will take before the spill is likely to be too goopy to break up with dispersants.

But the data from ADIOS - it stands for Automated Data Inquiry for Oil Spills - can be spotty, specialists say. Some is based on observations from real spills; some is projected theoretically from the viscosities and boiling points of petroleum products.

James L. Simmons, a suburban Washington oil-spill consultant formerly affiliated with Marine Spill Response, said Battelle's approach generates much more "scientifically rigorous, thorough analysis" than ADIOS can.

The Battelle tank, about 16 feet across and 4 feet high, and the chamber surrounding it can create saltwater and air temperatures anywhere from 24 to 86 degrees Fahrenheit and winds up to gale force, with churning waves and currents to match.

Computerized sensors record mi-

croscopic changes in conditions such as hydrocarbon levels in the water and air and the size of suspended oil droplets.

The only comparably versatile tank is owned by the Norwegian institute IKU, a sometime research partner of Battelle's that is compiling its own data.

A third tank, in Japan, is outdoors and depends on Mother Nature for weather, according to Battelle research chief Bill Steinhauer.

Although Norway sponsors deliberate annual spills of oil into the North Sea for research and training in cleanups, such exercises would be politically unthinkable in the United States, specialists here say. Battelle's Duxbury tank is offering

The test tank in Duxbury, about 16 feet across and 4 feet high, can generate wind, waves, and a broad range of temperatures.

something close to the next best thing.

It does have limitations. For example, the doughnut-shaped water course cannot adjust for the vagaries of water currents, undersea topography at a spill site, or the role that swirling silt and sand play in aggravating an oil slick, all factors that affect a spill's severity.

But already, Uhler said, the Duxbury tank has provided some insights into the behavior of odd products like No. 6 fuel, burned in ships and power plants, which in the right conditions can alternately sink and rise, confounding cleanup efforts.

Over the coming year, Battelle has contracted with several manufacturers to test many new dispersants on oil in the tank, contributing to the roughly \$500,000 in research the tank has helped attract to the

Duxbury site.

Dispersants, which are much more commonly accepted for use in Europe than in the United States and Canada, are essentially potent versions of laundry detergent that break up oil clots into benign droplets that scatter in ocean water.

Dispersants can greatly reduce the need for containing, skimming or burning spilled oil, but in some instances - like the infamous 1967 Torrey Canyon spill off England - they can cause more environmental damage than the oil.

Though the spills at the tank here usually involve less than 3 gallons of oil in a 1,000-gallon tank, they usually take two weeks to clean up.

Clean Harbors, a Quincy firm, has to gather up and treat the water that remains.